# SECTION 07 16 17

# CAPILLARY WATERPROOFING

## PART 1 GENERAL

### 1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Definition: Dry space means interior areas not used for containing water.

### 1.2 SUBMITTALS

A. Manufacturer's instructions: Submit three copies of waterproofing material manufacturer's preparation and application instructions.

B. Manufacturer's Field Reports:
1. Engage material manufacturer's representative for inspection service before application to examine suitability of substrate.
2. Ensure during and after application that specified products are being used, proper amount of waterproofing is being applied and finishing procedures are being implemented.
3. Submit three copies of inspection reports by manufacturer's representative.

### 1.3 QUALITY ASSURANCE

A. Qualifications: Applicators shall be trained in application procedures and approved by membrane manufacturer.

B. Perform work of this Section by an applicator of recognized standing having not less than five years proven experience on work of similar size and scope.

C. Arrange for manufacturer’s review of preparation for and application of waterproofing system.

D. Pre-Installation Meeting:
1. Arrange a site visit prior to commencement of waterproofing to review with installer, manufacturer's technical representative and Contract Administrator, installation procedures to be adopted, and conditions under which work will be carried out.
2. Review weather conditions under which work will be done, substrate conditions, applicable procedures and protection of completed work.

### 1.4 DELIVERY, STORAGE AND HANDLING

A. Provide materials in original packaging with labels and seals intact.

B. Store and protect materials in a dry enclosed area.

1.5 SITE CONDITIONS

A. Comply with manufacturer's requirements regarding surface and ambient temperatures before, during and 48 hours after application.

B. Protect surrounding surfaces from damage.

1.6 SEQUENCING AND SCHEDULING

A. Apply waterproofing within duration after concrete pour recommended by manufacturer.

1.7 WARRANTY

A. Submit a two year warranty for the work of this Section against defects in workmanship and materials including but not limited to deterioration and leakage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Waterproofing system:
   1. Products and Manufacturers:
      a. Permaquik 200 Crystalline Waterproofing by Tremco Commercial Sealants & Waterproofing.
      b. Krystol Broadcast by Kryton International Inc.
      c. Xypex Concentrate DS-1 by Xypex Chemical Corporation.

PART 3 EXECUTION

3.1 APPLICATION - GENERAL

A. Comply with manufacturer's requirements regarding surface and ambient temperatures before, during and after application.

B. Apply waterproofing system in accordance with manufacturer's printed instructions and in manner to ensure treated surfaces are waterproof.

C. Do not apply waterproofing to during snow or rain.

3.2 APPLICATION - HORIZONTAL CONCRETE SURFACES

A. Dry sprinkle waterproofing on concrete surfaces prior to initial set at the rate of 1.3 kg/m². Power trowel or wood float surface to uniform coverage and specified finish.

3.3 SCHEDULE OF APPLICATION

A. Apply waterproofing in locations shown on Drawings and Details.

3.4 PROTECTION

A. Protect freshly treated surfaces from rain for at least 24 hours.

B. Do not expose treated surfaces to liquid media for minimum period of one week.

END OF SECTION

# SECTION 07 21 00

# THERMAL INSULATION

## PART 1 GENERAL

### 1.1 SUMMARY

A. Comply with Division 1, General Requirements.

### 1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulations
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
   3. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials
   4. CAN/CGSB 51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction
   5. CAN/ULC S701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
   6. CGSB 71-GP-24M Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation

### 1.3 SUBMITTALS

A. Submit two samples 300 mm square of insulation materials and fasteners.

### 1.4 QUALITY ASSURANCE

A. Perform work of this Section by an insulation applicator of recognized standing having not fewer than five years, continuous proven experience on projects of similar size and scope.

B. Employ only skilled mechanics having experience and an understanding of design principles of thermal, air and vapour barriers.

### 1.5 DELIVERY, STORAGE, AND HANDLING

A. In cold weather, provide warm storage for adhesives such that their consistency is suitable for application.

1.6 SITE CONDITIONS

A. Protect surfaces, and in particular the building cladding finishes, from being marred or contaminated by the materials. Examine the work of other Sections where such work is closely associated with the work of this Section and report any damage done to the work of this Section.

B. Protect work of this Section from damage due to high velocity winds until building cladding or other permanent protection is in place.

C. Maintain surface and ambient temperatures constantly between 10 degrees C and 38 degrees C during application and curing of adhesive except as permitted otherwise by the [Contract Administrator] in writing.

1.7 WARRANTY

A. Submit a two year warranty for the Work of this Section against defects in materials, and workmanship including but not limited to integrity and continuity of the thermal, air and vapour barriers.

PART 2 PRODUCTS

2.1 MATERIALS

A. Polystyrene Insulation: CAN/ULC S701, Type 4, rigid, expanded, extruded polystyrene board insulation, RSI=0.87 per 25 mm thickness and a minimum compressive strength of 240 kPa at 10 percent deformation or yield; shiplapped edges.

B. Insulation Adhesive
1. Insulation Adhesive: Bakor 230-21 by Bakor Inc., solvent type, rapid cure for adhering polystyrene, glass fiber, mineral fiber, or urethane insulation.
2. Primer for Adhesives: Recommended by the adhesive manufacturer for the particular substrate and the materials to be adhered.

C. Air Seal at Expansion Joint: Thermofusible membrane of elastomeric bitumen reinforced with polyester mesh, 1.5 mm thick Blue Skin SA by Bakor Inc. or Soprajoint Soprema Waterproofing Inc. Primer: As recommended by manufacturer of membrane.

D. Insulation Fasteners:
1. UCAN MJP Series, minimum 25 mm longer than thickness of insulation.
2. Mechanical Fastening System: Bailey Retainer Tee 48 mm wide, 0.63 mm thick, zinc coated steel furring channel, predrilled at 150 mm o.c., complete with fasteners, by Dow Chemical Canada Inc. Size fasteners to allow minimum embedment 25 mm in concrete or masonry wall.
3. Fasteners: Stainless steel, powder activated, complete with washers, type and size to suit applicable condition.

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. Ensure that surfaces to receive adhesive or insulation are dry, suitable for bond, and free from loose material, projections, ice, frost, grease, oil or other matter detrimental to bond of the adhesive or uniform bedding of the insulation.

B. Examine substrate and report unacceptable conditions. Commencing work will imply acceptance of substrate conditions.

### 3.2 INSTALLATION - GENERAL

A. Install materials in accordance with the manufacturers' printed instructions and as specified.

B. Fit each board against adjacent boards. Stagger joints. Fit board neatly with tight joints around pipes, ducts, obstructions, openings and corners.

C. Do not enclose insulation permanently until installation has been accepted. Coordinate installation of insulation with scheduling for enclosing materials.

D. Provide appropriate protection to maintain integrity of installed insulation until facing materials are in place.

### 3.3 INSTALLATION - INSULATION FASTENERS

A. Install insulation fasteners for attachment of insulation. Apply to concrete or on underside of structural slab substrate using drilled pilot holes. Install insulation fasteners 25 mm from end and edge of board at 600 mm o.c. and at the rate of one per square metre (one/10 $ft^2$) for remainder of board.

B. Do not support insulation on clips until adhesive has set. Mechanical fasteners applied to steel air and vapour barriers, remove primer paint and use welded insulation clips.

### 3.4 INSTALLATION - INSULATION

A. Butt insulation boards tightly and stagger joints. Set insulation into adhesive.
   1. Cut insulation and fit tightly to strapping, pipes, ducts, obstructions, openings and corners.
   2. Bevel board edges abutting sloping surfaces.
   3. Cut out back of board insulation as required to accommodate substrate irregularities and build up over cut out areas on the other side as required to ensure thermal barrier uniformity.

### 3.5 MISCELLANEOUS BUILDING CAVITIES

A. Pack batt insulation tightly into miscellaneous building cavities as required to ensure a continuous thermal barrier.

3.6 INSTALLATION - PERIMETER INSULATION

A. Install perimeter insulation to inside face of exterior walls below slabs on grade. Extend insulation finished exterior grade from/to elevations as indicated on drawings. Return 450 mm minimum along intersecting walls. Laminate insulation to vertical walls by applying 50 mm diameter adhesive daubs at 600 mm o.c. Butt boards tightly.

3.7 CLEANING

A. Clean surfaces marred or otherwise damaged to Contract Administrator acceptance, including steam cleaning. Pay the cost of replacing finishes or materials that cannot be cleaned.

END OF SECTION

# SECTION 07 52 16

# SBS-MODIFIED BITUMINOUS MEMBRANE ROOFING

## PART 1 GENERAL

### 1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Materials only applied to this Contract: Vapour Retardant under Clause 2.1.F.

### 1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
   2. ASTM B209-M Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   3. CGSB-37GP-9 Ma Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
   4. CSA HA Series-M CSA Standards for Aluminum and Aluminum Alloys.
   5. CSA A123.4-M Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
   6. Canadian Roofing Contractor’s Association (CRCA).

### 1.3 SUBMITTALS

A. Shop Drawings:
   1. Project-specific details of roof edges and penetrations.

B. Quality Control Submittals:
   1. Manufacturer’s installation instructions.
   2. A letter from roofing materials manufacturer stating roofer is approved by manufacturer to apply roof.
   3. Sample copy of special warranty to be provided.
   4. Record of Pre-roofing Conference.

### 1.4 QUALITY ASSURANCE

A. Qualification: Membership in good standing of Canadian Roofing Contractor's Association and approved by membrane manufacturer.

B. Perform work of this Section by a roofing applicator of recognized standing approved by membrane manufacturer, having not less than five years proven experience on work of similar size and scope.

C. Arrange for membrane manufacturer's review of preparation for and application of roofing system.

D. All components used in a roofing system shall be furnished by, or approved by, manufacturer whose roofing system is selected for use.

E. Pre-roofing Conference:
1. Attendees: Conduct pre-roofing conference with Contract Administrator, roof deck installer, roofing system materials manufacturer’s representative, roofer and Contractor.
2. Arrange a site visit prior to commencement of roofing to review with installer and Contract Administrator, installation procedures to be adopted, conditions under which work will be carried out, and inspect surfaces requiring roofing.
3. Review weather conditions under which work will be done, substrate conditions, preparation of existing surfaces, applicable procedures, protection of completed work, and sample of sealed seam to determine acceptable workmanship.
4. Record: Discussions and agreements and furnish copy to each participant and entity invited.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with labels intact and legible. Labels on bitumen shall show composition.

B. Store materials in heated location to minimum 10 degrees C during winter.

C. Protect materials against direct sunlight, wetting, moisture absorption, mud, dust, sand, oil, grease, dirt, and construction traffic.

D. Store material rolls on end with selvage edges up.

E. Avoid stockpiling of materials on roof.

1.6 SITE CONDITIONS

A. Protect adjacent surfaces which are not to be roofed from soiling in connection with the work of this Section.

B. Protect roofed areas.

C. Ambient and surface temperatures: at least 10 degrees C for a period of 48 hours before, during and after membrane application.

1.7 WARRANTY

A. Submit a 2 years warranty for the work of this Section against defects in materials and workmanship, including but not limited to bond failure, deterioration, seam failure,

leakage for entire roofing system except as the result of structural failure of the concrete substrate.

B. Cracks up to 1.6 mm wide arising from normal shrinkage and expansion of concrete will not be considered as structural failure.

## PART 2 PRODUCTS

### 2.1 MATERIALS

A. Primer: Approved by membrane manufacturer.

B. Asphalt: CSA A123.4M Type 2.

C. Securement Bar: ASTM B209-M aluminum or ASTM A167, 304 alloy stainless steel 3 mm thick by 25 mm wide, galvanized concrete fasteners, 25 mm diameter galvanized washers.

D. Joint Backing: Closed cell, heat resistant, crosslinked polyolefin foam filler as recommended by manufacturer of sealant. Minimum 25 percent oversized. Bond breaker strip as recommended by manufacturer.

E. Vapour Retardant: Minimum 2.0 mm thick, elastomeric asphalt with glass fibre mat reinforcement 95 g/m², sanded both sides. Elastophene by Soprema Waterproofing Inc., Vedaflex G100 S/S by Monsey Bakor Inc.

F. Reinforcing Sheet: 3.0 mm thermo-fusible elastomeric asphalt with non-woven polyester reinforcement faced with 0.025 mm clear polyethylene or polypropylene both sides. Sopralene Flam 180 by Soprema Waterproofing Inc., Vedaflex NP180 P/P by Monsey Bakor Inc.

G. Mechanical Fasteners: As recommended by manufacturer.

H. Flexible Flashing: 2 layers of polyester reinforced sheet.

I. Sealant: As recommended by membrane manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. Examine surfaces to receive membrane roofing. Report defects which would impair performance of roofing. Do not proceed until substrate is acceptable. Check that concrete moisture content is less than 15 percent.

B. Ensure that substrates have cured at least 28 days.

C. Verify elevation of roof drains, do not commence work until unacceptable conditions have been corrected. Make insulation thickness at drain 25 mm minimum. Slope insulation uniformly to drain.

3.2 PREPARATION

A. Refer to Division 3 for removal of existing roofing and preparation of concrete deck.

B. Check that completed roof deck for proper levels and slope before roofing is commended.

C. Do not apply membrane in inclement weather.

D. Free surfaces from materials detrimental to the bond of the membrane materials. Employ light sand blasting or steam cleaning where necessary to remove form oil.

E. Grind edges and corners bullnose with minimum radius of 38 mm. Fill inside corners with fillets or cants compatible with membrane.

3.3 INSTALLATION – MANUFACTURED UNITS AND ROOFING ACCESSORIES

A. Install factory assembled units in accordance with manufacturer's printed instructions.

B. Set curb flange in continuous bed of sealant and anchor in place.

3.4 INSTALLATION - VAPOUR RETARDANT AND INSULATION

A. Prime the concrete substrate at rate recommended by membrane manufacturer for particular surface porosity, and generally at 1000 to 1500 g/m² minimum.

B. Install vapour retardant in a mopping of asphalt applied at the rate of 1000 to 1500 g/m² where shown. Install tapered and rigid insulation in designed sequence over vapour retardant. Lay insulation in parallel course. Stagger joints between pieces. Trim insulation to provide plain butt joints. Level the edges of the insulation at fillets and cants.

3.5 INSTALLATION - MEMBRANE

A. Install membrane roofing in accordance with manufacturer's printed instructions and as specified.

B. Horizontal Surface - Base Sheet
   1. Apply base sheet membrane mopping of 1000 to 1500 g/m² of asphalt. Provide 75 mm side laps and 150 mm end laps.
   2. Take base sheet to top of cant or to edge of horizontal surface.

C. Torch welding: soften the inner side of sheet without overheating, with even heat until the coating flows, resulting in uniform adhesion over the entire surface. Do not damage membrane or reinforcement.

D. Provide reinforcing strip 200 mm wide at changes in plane centred over edge of plane.

E. Vertical Surfaces – Cap Sheet and Cap Sheet Flashing Sheet
1. Apply cap sheet in strips of 900 mm to the vertical surfaces, extending onto the flat surface a minimum of 100 mm. Provide 75 mm side laps and 150 mm end laps. Stagger laps a minimum of 100 mm from the laps of the granular polyester reinforced sheet on horizontal surfaces to avoid excessive thickness.
2. Torch weld granular cap sheet directly on its substrate from bottom to top.
3. Secure top edge of sheet membrane using continuous securement bar fastened on 300 mm o.c.

F. On vertical surfaces where membrane is covered with metal flashing, provide polyester reinforced sheet.

G. Horizontal Surfaces - Cap Sheet
1. Over base sheet torch weld cap sheet. Unroll granular cap sheet starting from low points. Take care to ensure good alignment of the first strip parallel with the edge of the area.
2. Stagger base sheet and cap seams a minimum of 300 mm.
3. Provide 75 mm side laps and 150 mm end laps. Remove granules on 150 mm end laps before torch application.
4. After installation of the cap sheet, check lap seams.
5. During installation keep asphalt seepage at seams to 6 mm maximum. Over joints apply matching granules and sweep off excess.

H. Ensure that sheets have been continuously welded, without air pockets, wrinkles, fishmouth or tears.

I. Bar completed area from traffic until membrane protection is installed.

## 3.6 INSTALLATION - ROOF DRAINS

A. Inspect roof drain setting and ensure that drain outlet will not be above the general level of completed roof membrane.

B. Cut back insulation at drains to form drain well.

C. Extend membrane into the upper surface of the drain base and ensure a watertight seal between membrane and drain and seal with clamping ring.

## 3.7 INSTALLATION - ROOF WALKWAYS

A. Prime walkway area. Torch apply granular cap sheet of grey colour to layout shown. Butt ends of sheets. At edges and joints of sheet, sprinkle granules into asphalt.

3.8 INSTALLATION - MISCELLANEOUS ROOF OPENINGS

A. Supply and install flashings and sleeves around mechanical and electrical openings, ducts, pipes and other projections through roofs. Seal flexible flashing with adhesive and stainless steel clamps.

B. Fabricate metal sleeves around vent pipes and other similar items from 0.95 mm stainless steel.

C. Dress down metal counterflashings supplied by the Section providing the item passing through the roof and seal and make good the completed installation with sealant.

3.9 APPLICATION - SEALING

A. General:
1. Apply sealant into reglets upon completion of flashing.
2. Ensure that surfaces to be sealed are free from contaminants which may adversely affect the performance of the sealing materials.
3. Clean joint surfaces and mask adjacent areas. Remove masking promptly after sealing is completed.
4. Prime joints immediately before installation of sealant.
5. Mix sealants to a uniform colour and free from unmixed material.
6. Before commencing sealing, test the materials for indications of staining or proof adhesion.
7. Maintain correct sealant depth. Make installation free from air pockets and embedded impurities and having smooth surfaces, free from ridges, wrinkles, sags, air pockets and imbedded impurities.
8. Immediately clean adjacent surfaces.

3.10 MANUFACTURER’S FIELD SERVICES

A. Provide manufacturer’s representative at site for installation assistance, inspection and certification of proper installation and training of City’s personnel for maintaining specified system.

3.11 CLEANING

A. Clean and make good to the Engineer's acceptance surfaces soiled or otherwise damaged in connection with the work of this Section. Pay the cost of replacing any finishes or materials that cannot be cleaned.

B. On completion of the work, check roof drains and ensure their cleanliness and proper function.

END OF SECTION